

On April 6, 2021, NASA's *Perseverance* Mars rover took a selfie from 3.9 m, with the *Ingenuity* helicopter seen in the distance. The project will search for evidence of past life on Mars.

Prime Meridian

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The Earth Crisis and the great adventure of the 21st Century are unfolded hand-in-hand.

We cannot compartmentalise the world into neat separate boxes. Our ability to reach Mars and explore its surface is another example of the rush forwards of our technological abilities - alongside the changes, some of them deadly, created here on Earth by our civilisation. If Mars turns out to support life, most likely below the surface, what would be the impact of our species reaching out to this neighbour in space? As our robots travel across the rock-scape of our neighbouring planet, it has already become part of the human environment.

The USA's *Perseverance* rover, together with its small *Ingenuity* helicopter, arrived in Mar's Jezero Crater on February 18, 2021. China's Zhurong rover landed safely in Utopia Planitia touching down on May 14, 2021. The debate about how we should manage Mars and its possible life is already underway.

Climate watch: NOAA has reported that April 2021 was the 9th warmest April in a 142 year record.



Above: The second flight of Ingenuity taken by the *Perseverance* rover 79 metres away. April 22, 2021. Credit: NASA/JPL-Caltech/MSSS

Runaway ecology: Earth and the Martian frontier.

Runaway ecology is a term that we have used in our newsletter to describe a process in which our species is transforming its own ecological niche, during the course of a human life time.

On December 17, 1903, two brothers, Orville (1871 - 1948) and Wilbur (1867 - 1912) Wright, achieved the first heavier-than-air flight in the Wright Flyer. Not too far from the town of Kitty Hawk in North Carolina, the 274 kg (not counting the pilot) aircraft, reached just 20 feet above the ground and remained in the air for 12 seconds as it travelled a mere 37 m. By the year 2019, so we hear from the International Civil Aviation Organization (ICAO), the global number of aircraft passengers was 4.5 billion in 2019.

<https://www.icao.int/annual-report-2019/Pages/the-world-of-air-transport-in-2019.aspx>

Air travel has become one of the great annual migrations of the animal kingdom - and much of that travelling is for no other purpose than holidays in other countries. This huge turnover in human ecology has occurred within some 116 years, which is not beyond the limits of an extreme human lifespan.

On April 19, 2021, NASA's *Ingenuity* helicopter, carried to Mars on the *Perseverance* rover took flight as the first powered aircraft on another planet. This was an astonishing accomplishment, given that the atmosphere of Mars being roughly a hundred times more tenuous than that of our planet. This flight lasted for only 39.1 seconds and *Ingenuity* reached 3.0 m into the sky, before hovering and rotating and landing. In recognition of this moment of history, the small aircraft carried a fibre from the wing of the original *Wright Flyer*. The ICAO had given *Ingenuity* an official airport code, namely JZRO, and the helicopter's landing strip was named Wright Brothers Field.

In terms of a commonplace healthy 80 years, from the beach in North Carolina in 1903 to the events in Mars took slightly less than one and a half human lifespan.

As our exploration of Mars expands, so too will the debates about environmentalism and ethics. *The New Yorker* (May 11, 2021) carried a thought-provoking discussion from Adam Mann: "Is Mars Ours? Should we treat other planets like natural resources or national parks?"

A quotation from aerospace engineer Moriba Jah (University of Texas at Austin) summed this up neatly: "If we went to Mars today, what would we see? . . . Some scattered debris, heat shields that have been broken up, parachutes flapping in the wind . . . So we're doing it again. There is an environment. It may not be an ecosystem defined as having living organisms, but it is a place of human interaction, and so it needs to have protective measures." <https://www.newyorker.com/science/elements/is-mars-ours>



A mostly cloudless UK and Ireland on Earth Day, April 22, 2021.

The idea of Earth Day came from Christian peace activist John McConnell (1915-2012). The first event was on March 21, 1970 at the Northern Hemisphere' spring equinox, supported by U Thant (1909-1974) Secretary General of the United Nations. This picture was taken by the EPIC (Earth Polychromatic Imaging Camera) system aboard the DSCOVR (Deep Space Climate Observatory) space craft (NASA/NOAA) at 10:56:43 UTC.

Global climate: The 9th warmest April in a 142 year record.

NOAA (USA's National Oceanic and Atmospheric Administration): "The April 2021 global surface temperature was 0.79°C (1.42°F) the 20th century average of 13.7°C (56.7°F). This was the smallest value for April since 2013 and was the ninth warmest April in the 142-year record. April 2021 marked the 45th consecutive April and the 436th consecutive month with temperatures, at least nominally, above the 20th-century average. December 1984 was the last time a monthly temperature was below average." Data provisional. NOAA data from: <https://www.ncdcnoaa.gov/sotc/global/202104>



Above: Northern Hemisphere spring is well underway, with oak leaves and catkins emerging. A waxing Moon in a cloudless sky. Earth Day, April 22, 2021.

Seasons in South East England

April 2021

Sunnier, but colder, and dry.

The UK Met Office reported:

The provisional UK mean temperature was 5.7°C, which is -1.7°C above the 1981-2010 long-term average. England 6.2°C with -1.9°C above the norm. Our region (England SE & Central S) had the UK's second warmest mean temperature at 6.6°C (12.1°C above the norm) and England SW & Wales at 6.8°C (-1.3°C above the norm).

The UK's most extreme temperatures were found beyond our region. The warmest day, on April 1 was 21.4°C at Treknock, Cornwall, in SW England. The coldest was -9.4°C at Tulloch Bridge, Inverness-shire, Scotland) on April 12.

According to the UK Met Office:

“Many areas were very dry, with only parts of Wiltshire and northern Scotland exceeding 50% of average rainfall, making it provisionally the UK's fourth driest April in a series from 1862.”

<https://www.metoffice.gov.uk/research/climate/maps-and-data/summaries/index>

Monthly means for SE and central S England. Max. temp.: 12.0°C (-1.2°C); min. temp.: 1.2°C (-3.1°C). Hours of sunshine: 225.0 (132%). Rain: 10.1 mm (19%). Anomalies re. 1981-2010 norm in brackets. Date obtained from Met Office on-line monthly reports.

<https://www.metoffice.gov.uk/research/climate/maps-and-data/regional-values>



Above: Lambing in the fields near Hartley Bottom, Kent on the first day of the month.
Below: In the woods on the hill at Ridley, Kent, welcome spring wood anemones (*Anemone nemorosa*) were out in profusion



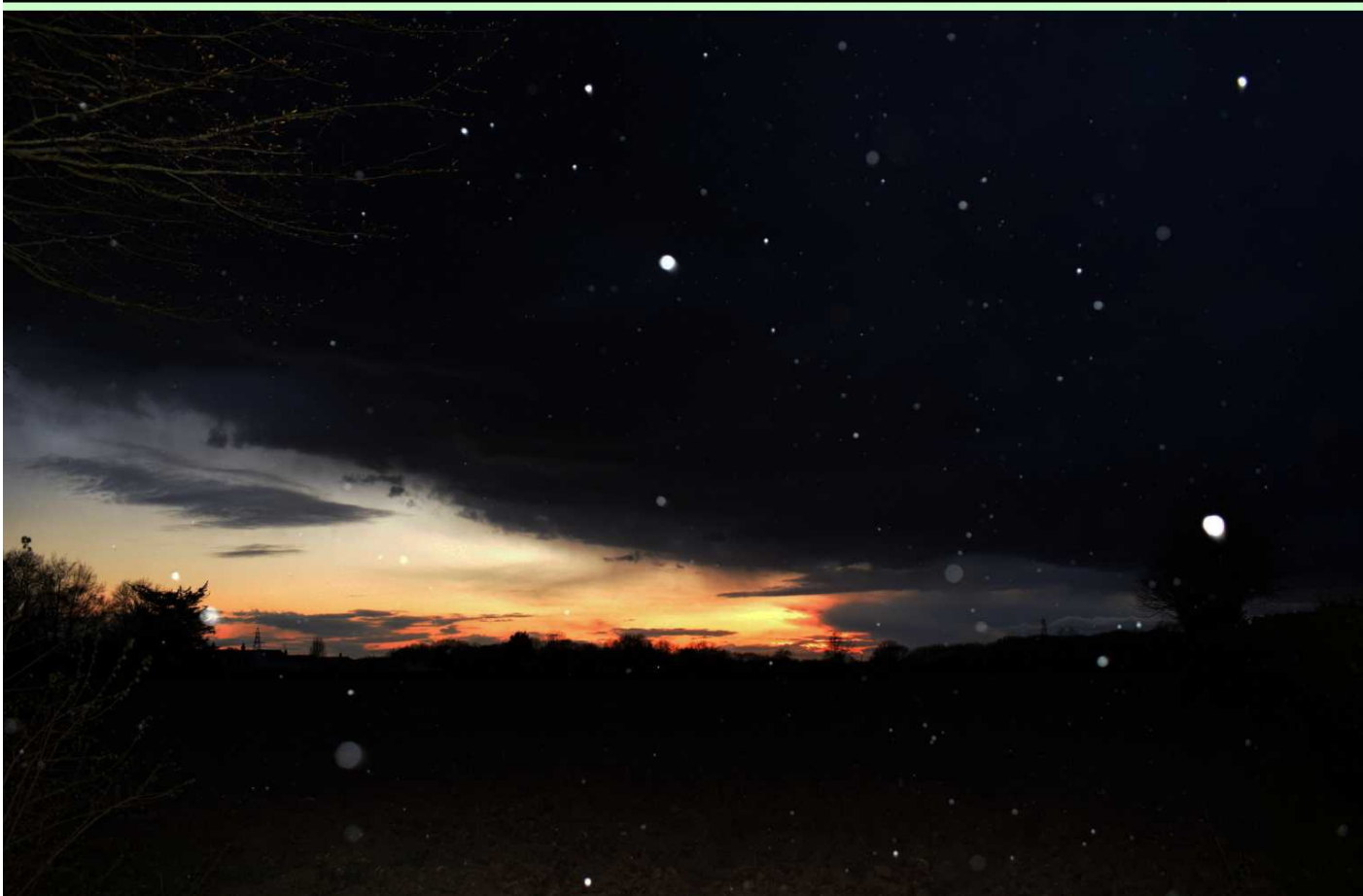
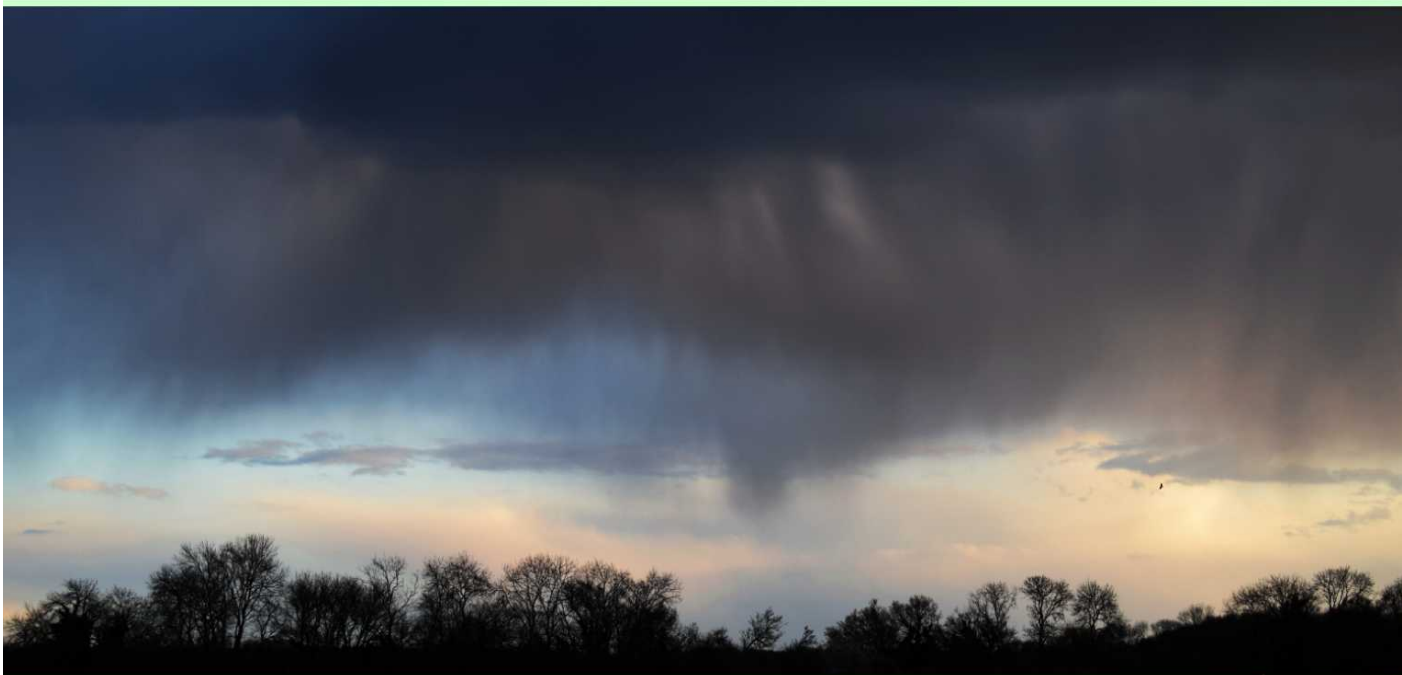


The Christian calendar continued as usual, but due to the pandemic, without the normal opportunities for large meetings.

Good Friday occurred on April 2, 2021. St. Peter and St. Paul's Church at Ash, Kent, where Jesus' Crucifixion and Tomb were represented.

Easter 2021 was on Sunday April 4. The west end of the Church was open, but with a limited congregation. *Narcissus* outside the Church.

Next page, April 6, Kent. Top: The Sun was sinking in a view across fields towards Green Street Green, Kent. A sundog to the left of Sun. Centre: Snow clouds seen from the area of Brands Hatch, Lower: After night had fallen, snow was coming down in the church yard at Ash.





April 18. Near West Kingsdown, Kent. There was a stunning mackerel sky of high cloud above a hedgerow with numerous blackthorn, or sloe (*Prunus spinosa*) in flower.





Above left: A disc harrow sitting in a field descending into Hartley Bottom, Kent. April 17, 2021. Above right: Three fox cubs were an unexpected treat on April 27, 2012. Enjoying the warm sunshine, they had been exploring a woodland in Kent, among the bluebells. Unfortunately, I did not have a suitable lens to get a long shot of them, and although I carried one with me afterwards, I neever saw them again. Below: Cracked soil after a dry month. Beacon Wood, Bean, Kent. April 28, 2021.





Above: Bluebells (*Hyacinthoides non-scripta*) are a very popular with people walking in the woods in the spring - although more discerning observers may recognise hybridisation with Spanish bluebells, with their wide bells. Below: Some other regular spring wild flowers. Common dog-violets (*Viola riviniana*) surrounding primroses (*Primula vulgaris*). Beacon Wood, Bean, Kent. 27, 2021.





Some views of the Moon in April, 2021.

The Moon appeared as a sliver on April 13. On both April 15 and 16, the Earth shine is lighting up the dark part of the Moon, where the sunshine had not yet reached.

On the night of April 15, the Moon slid beside the 4.94 magnitude star ω 2 Tauri. This is an unremarkable star that drew attention only because it happened to be so close to the Moon in the sky. This hot, white star of spectral type A, lies about 94 light years away, is about twice as massive as our Sun and has one and a half times its diameter.

The Full Moon of April 27 April (3.31am, UTC).

New Ash Green, Kent.





Above: Where woodland meets fields, trees are seen coming into leaf as spring advances. Sunshine had broken through grey clouds and episodes of rain. Beacon Wood, Bean, Kent. April 30, 2021.

Prime Meridian.

Prime Meridian is published by the Ecospheres Project, a research and media collaboration. It follows global environmental issues alongside the cycle of the seasons in South East England. It steps back to look at the Earth in its astronomical context and it pursues the search for other habitable worlds.

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The Moon past full, rose through trees on the night of April 27 and soon emerged from clouds in the early hours of April 28, 2021.

